AYK REGION
STOCK STATUS REPORT # 12

A DEVELOPING FISHERY
(emphasis on chum salmon)

From a Presentation presented by Ronald I. Regnart
at the 1976 Northeastern pink & chum salmon workshop

Alaska Dept. of Fish and Game
Division of Commercial Fisheries

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ARCTIC- YUKON-KUSKOKWIM REGION: A DEVELOPING FISHERY
(emphasis on chum salmon)

Description of Region

The Arctic-Yukon-Kuskokwim region includes all of the drainages of the Bering Sea and the Arctic Ocean from Cape Newenham to the Canadian border and, in addition, includes Nunivak, St. Lawrence and St. Matthew Islands. This vast region covers approximately 4/5 of the state (Figure 1). It's inhabitants include 40,000 Indian and Eskimo residents, most of whom are still dependent to varying degrees on fish and game resources for their livelihoods.

Subsistence Fishery

Although early catch records were incomplete, annual catches made in the region during the early 1900's probably approached or exceeded 2 million salmon. Then, as now, the majority of salmon taken for personal use were chums. A great majority of this species are fed to sled dogs.

During the 1930's, the airplane began replacing sled dogs as the primary means of transportation and this started the gradual decline in subsistence fishing. This decline has been accelerated in recent years due to increased welfare and employment income and the use of snow-machines.

Since 1968 the region's commercial catch has exceeded the subsistence catch on an annual basis. Annual subsistence catches in the region now range between 400,000 to 700,000 salmon (approximately 90% chums). In terms of replacement protein, the value of the present subsistence catch to the fishermen is approximately $1,000,000.

Accurate documentation of the subsistence harvest is a special problem. Each year several crews are sent out by boat and aircraft to conduct personal interviews. Also, prior to the season, catch calendars are

mailed to every fisherman to facilitate acquisition of catch and effort data.

Commercial Fishery

With the exception of the Yukon River king salmon fishery, sustained commercial fisheries have developed in in the region since 1961. The greatest commercial fishery expansion has occurred in the last 6-7 years and has been targeted on chum salmon which is the most abundant species. Chum salmon have an excellent market demand, especially in Japan. Also, recent price increases have made this species more attractive to local fishermen.

Until the last few years, chums in some areas were reserved solely for subsistence use and commercial fishing was either prohibited or restricted for this species. However, due to the decline in subsistence dependence and utilization and new information regarding run magnitudes, increased commercial harvests of chums have been allowed in recent years.

In each of the last two seasons, the commercial chum catch in the region has been just under two million fish. Pink salmon are taken incidentally to fishing for other species, and annual catches of this species have never exceeded 210,000 fish.

Review by Management Area

The region is divided into six management areas and the following is a brief description of the status of stocks and fisheries in some of the more important ones.

Kuskokwim Area: The major commercial and subsistence fisheries are located in Goodnews Bay, in Kuskokwim Bay adjacent to the village of Quinhagak, and in the Kuskokwim River. The largest commercial fishery occurs in the lower hundred miles of the Kuskokwim River. Excluding Nunivak Island, there are 26 known chum and pink streams in the area.

Pink salmon are only abundant in coastal waters (Goodnews River,

Kanektok River) during even years. In excess of 1,000,000 pinks have been documented in the Kanektok River.

Chum salmon are abundant in the Kanektok and Kuskokwim River drainages. The Kuskokwim River commercial chum salmon fishery began in 1971 and the potential of this fishery is still unknown. Kuskokwim River commercial and subsistence chum catches have averaged 400,000 annually during the last two seasons.

Yukon Area: The major commercial fishery occurs in the lower 150 miles of the river, although an expanding fishery exists throughout the upper Yukon to the Canadian border. Subsistence fishing occurs throughout the main stem and in several of the larger tributary streams.

There are a total of 62 known pink and chum salmon spawning streams, several of which are in excess of 100 river miles in length. A small pink salmon run is confined to the lower portion of the drainage.

The commercial catch of chum salmon has been just under 1,000,000 fish during each of the last two seasons. Similar to the Amur River in Russia, there are two races or stocks of chum salmon: summer and fall chums. Summer chums enter the river in early summer and their spawning is completed by August. This stock is more abundant, smaller in body size, and utilizes spawning areas in the lower portions of the drainage. Fall chums enter the river during late July through early September and their spawning may not be completed until November. These fish are less abundant, are larger in body size, and spawn only in spring areas in the upper portions of the drainage.

Norton Sound: This area constitutes a collection of small coastal marine fisheries. Commercial fishing began in 1961. At the present time, there are 28 known pink and chum salmon streams.

Pink salmon are more abundant than chums in this area and a run of 2,000,000 has been estimated for some years. The commercial catch of

this species has never exceeded 150.000 annually. There is no definite odd or even year cycle and the fish are very small, averaging three pounds even when taken with 5½" mesh gill nets.

Chum salmon are the target commercial species with catches averaging 190,000 annually during the last two years.

Kotzebue Area: This commercial fishery, which dates back to 1962, is located adjacent to the village of Kotzebue. It is the northern-most commercial salmon fishery in the state and therefore on the continent. Chum salmon are the only species available in harvestable numbers with the largest spawning populations occurring in the Noatak and Kobuk Rivers. Pink salmon are present but only in limited numbers. Commercial chum salmon catches have averaged 600,000 annually during the last two years.

Northern Area: Salmon fisheries do not exist in this area, although limited numbers of pinks and chums are present. A few specimens of both species have been recorded from Beaufort Sea drainages.

Selected Commercial Fishery Data

Figure 2 compares the AYK commercial chum salmon catch to the state-wide total. In 1975, approximately 50% of Alaska's catch came from the AYK region. In 1975, five million chum salmon were documented throughout the region (commercial and subsistence catch + escapement indices) but the total chum run was probably closer to 7-8 million fish.

Figure 3 presents Kotzebue chum salmon fishery data. Commercial catches in this area generally reflect salmon abundance and it can be noted that substantial run increases have occurred during the last 4-5 years. Escapement indices generally follow the trend in commercial catches.

Fig. 4 depicts Yukon River chum salmon fishery data. Prior to 1969 chum salmon were essentially taken only incidentally during the king salmon fishery. Commercial chum catches include approximately 250,000 fall chums annually; the remainder of the catch being summer chums.

Harvestable amounts of Yukon River chum salmon have been available during most recent years. The 1974 run was exceptionally large. For example, a minimum of 1,000,000 summer chum spawners was documented in a single spawning tributary. Fall chum escapements in 1975 were also unusually good with escapements up to 330,000 in a single tributary stream.

Possible Factors Influencing the Large Recent Chum Salmon Runs

AYK chums were not adversely affected by the extremely cold winter and spring temperatures of the 1970-71 and 1971-72 seasons. A majority of these northern chums mature at four years of age. Thus we were expecting very low returns both in 1974 and 1975. We know that other Bering Sea stocks were adversely affected (Bristol Bay sockeye) in addition to many Gulf of Alaska stocks.

We have no concrete facts to explain this, but the following are some educated guesses:

a. It is possible that due to either slower development and/or long distances that must be traveled, AYK smolt do not normally reach marine waters until mid or late summer when conditions are more normalized. Times of ocean arrival for AYK smolt are unknown but fry have been captured in some spawning areas located many miles from saltwater as late as July.

b. Survival of these fish in marine waters may have been enhanced due to the lack of competition from other salmon stocks which were present at reduced levels. We do know from high seas tagging studies that large numbers of AYK chums overwinter in the Gulf

of Alaska.

Management Strategies, Problems, Solutions

Our basic management approach must be conservative in nature for the following reasons:

a. To provide for the legitimate subsistence needs in addition to escapement requirements.

b. Subsistence fishing is relatively inefficient and requires greater numbers of salmon (compared to commercial fisheries).

c. Lack of information regarding the salmon resource.

Scheduled weekly fishing periods: All areas have scheduled openings and closures each week. The effect of this regulation is to spread the commercial harvest throughout the entire run which prevents intensive harvesting of just certain run segments. Fishing periods are occasionally changed by emergency order when imbalances between catch & escapement are clearly indicated. Scheduled weekly fishing periods may not be the ultimate management method, but under existing conditions of run forecasts and accurate in-season run assessments not being available, it seems to be most practical.

Poor escapement information: Many streams have never been surveyed in the region, and others can be surveyed only once every several years. For example, in 1975 a total of 28 new spawning areas were discovered in which a minimum of 100,000 chums and 500 king salmon were spawning. Limitations to obtaining good escapement information include turbid water conditions and the vast size of the region. To overcome these problems, we are attempting to complete basic catalog and inventory studies as soon as possible. Several potential weir, counting tower and sonar sites have been identified and will be implemented when funding is available. We are attempting to fly several surveys of major

spawning areas each season and are comparing aerial counts to known counts to increase accuracy of this method.

In-season run assessment: Since many spawning streams are located hundreds of miles from commercial fisheries, in-season run assessment is a major problem. It may be several days or up to eight weeks after the fish have passed through a commercial fishery before they can be viewed in clear water spawning streams. Test fishing sites have been established in two areas and commercial catch analyses are attempted in all areas. Due to the developing nature of the commercial fisheries, commercial catch data is increasingly difficult to analyze. A new "break-through" method must be developed, possibly using electronic fish detection systems in the large rivers or bays.

Intermingled stocks: This is a major problem in the Kuskokwim and Yukon Rivers and these fisheries are similar to ocean cape fisheries in that hundreds of different tributary stocks are being indiscriminately harvested. Stock identification studies have been planned for state-wide application and also regional tag recovery studies can be implemented to partially solve this problem.

Mixed species management: This is a special problem in the Yukon and Kuskokwim Rivers where kings and summer chums occur simultaneously. King salmon runs in these rivers have declined in recent years and require increased protection whereas summer chums, at least in the Yukon, are in healthy condition and can withstand increased utilization. This problem is partially solved by allowing only six inch or smaller mesh gill nets to be operated after a date ranging between late June to early July. This has resulted in decreased king salmon catches during the latter portion of the run but has allowed substantial increases in chum harvests. We have plans to move this mesh size changeover date to earlier in the season, and eventually plan that king salmon will be an inciden-

tally harvested species throughout the entire fishing season. Gill net selectivity experiments are required to fully determine the effect of different mesh sizes on species, age, sex and size compositions and also to determine the effect on the fishing industry.

Catch allocation: Commercial fisheries have recently been developed in the upper portion of the Yukon River drainage, and these fishermen have demanded a share of the fall chum salmon harvest. Due to the tremendous fishing effort that can be exerted on this stock (over one thousand river miles in length) the Board of Fisheries has established a 250,000 catch quota for the entire river with various sub-area quotas. This is the only major commercial salmon fishery that operates under a fixed quota system.

Subsistence fishing problems: Some form of regulatory control of subsistence fishing is necessary even though it is afforded the highest use. Generally, there are more subsistence fishing restrictions in areas with extensive commercial fisheries. However, many subsistence fishermen object to any form of regulatory control. Major controls are designed to keep subsistence fish from entering commercial channels and to prevent overharvest in smaller streams.

Sale of subsistence caught roe: This has recently been allowed by state legislation. Furthermore, this law allows the sale of subsistence caught roe to enter normal commercial channels with waivers of all commercial licensing and limited entry requirements. The staff is quite apprehensive about this legislation and previously recommended that a comprehensive set of regulations be adopted by the Board of Fisheries to control this new fishery. These new regulations have been promulgated with the result that wastage of carcasses and fishing just for the sale of roe have been minimized. Since we do not have adequate staffing to monitor this fishery and unscrupulous buyers or processors may become

involved in the future, we are sitting on a "time bomb".

High seas fishing: The Japanese mothership fleet annually takes between two to nine million chum salmon in the Bering Sea. In recent years, a larger share of this harvest has been taken in the central Bering Sea where little information exists regarding continental origin.

Figure 1. Map of Arctic-Yukon-Kuskokwim Region.

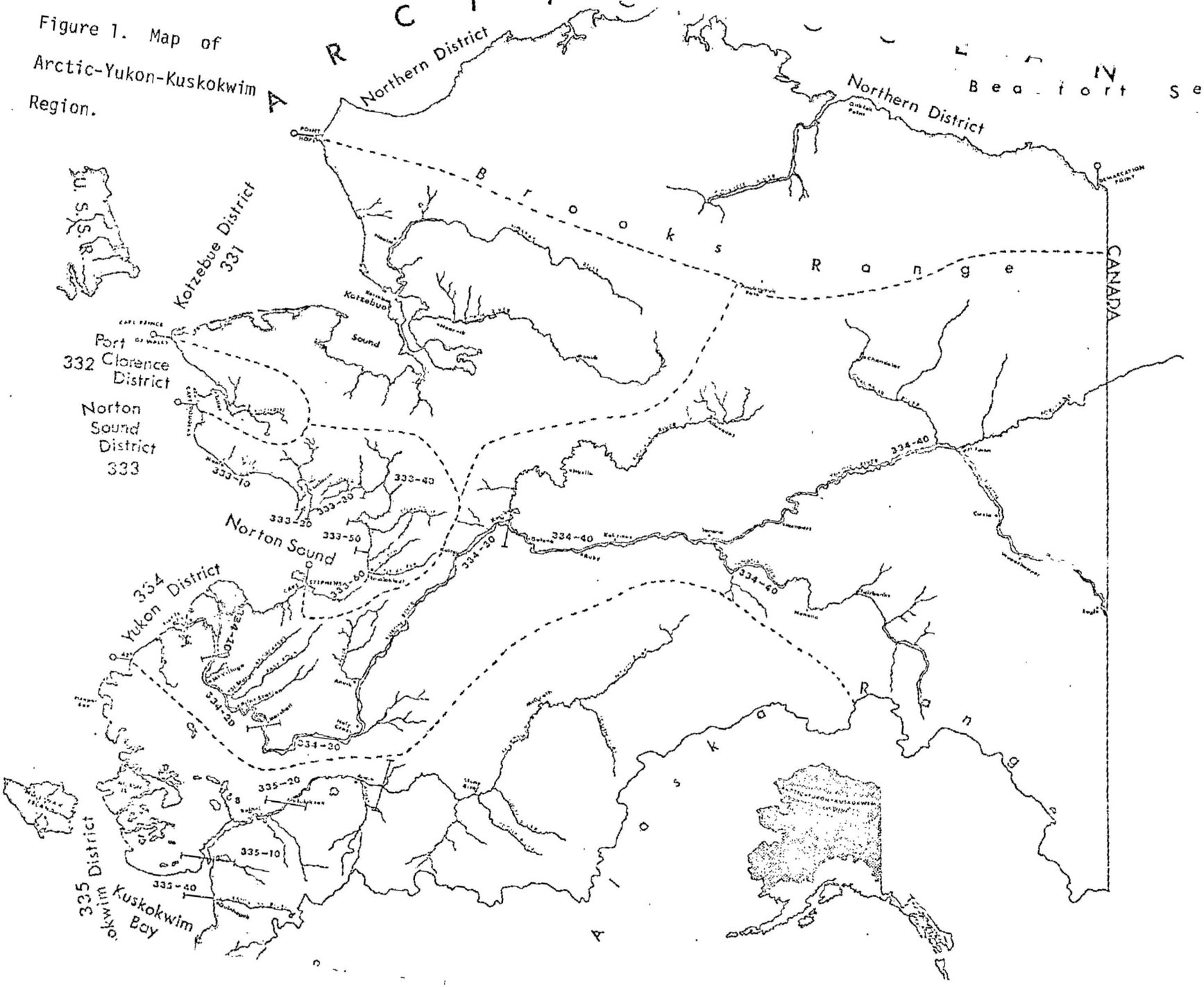

Figure 2

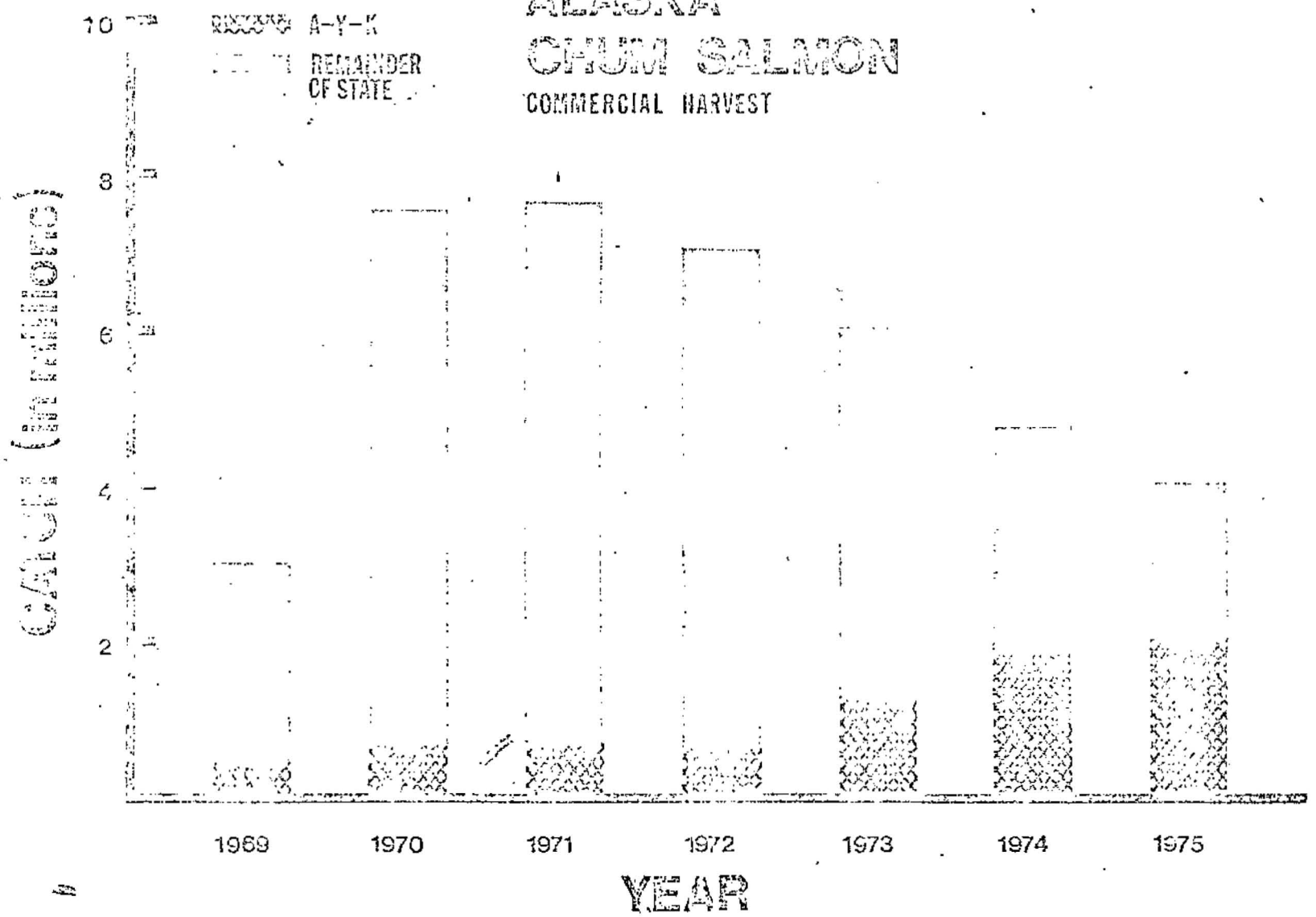
ALASKA
CHUM SALMON
COMMERCIAL HARVEST
A-Y-K
REMAINDER OF STATE
10
8
6
4
2
1969
1970
1971
1972
1973
1974
1975
YEAR

Figure 3

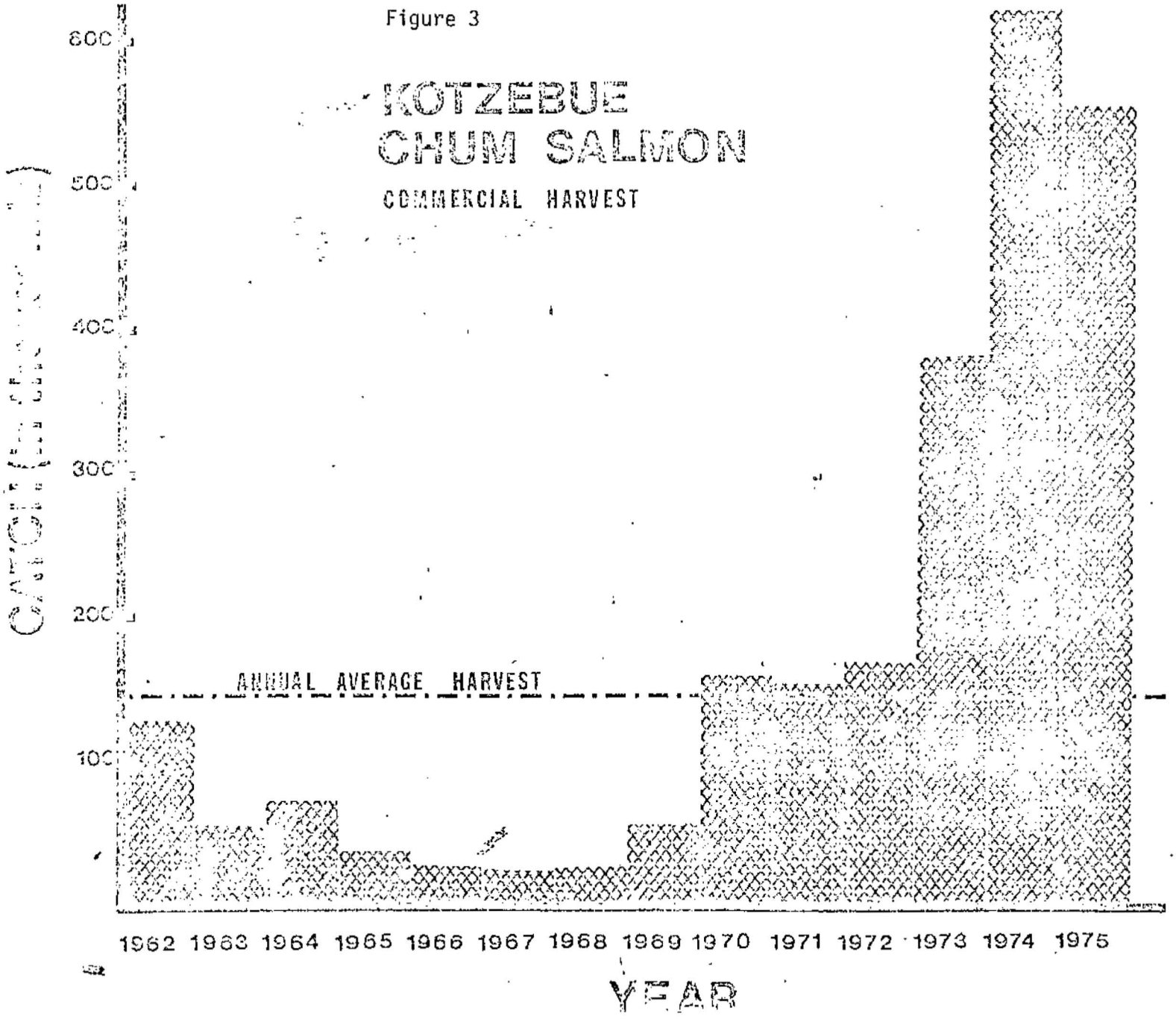
KOTZEBUE
CHUM SALMON
COMMERCIAL HARVEST
600
500
400
300
200
100
ANNUAL AVERAGE HARVEST
1962 1963 1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975
YEAR

Figure 4

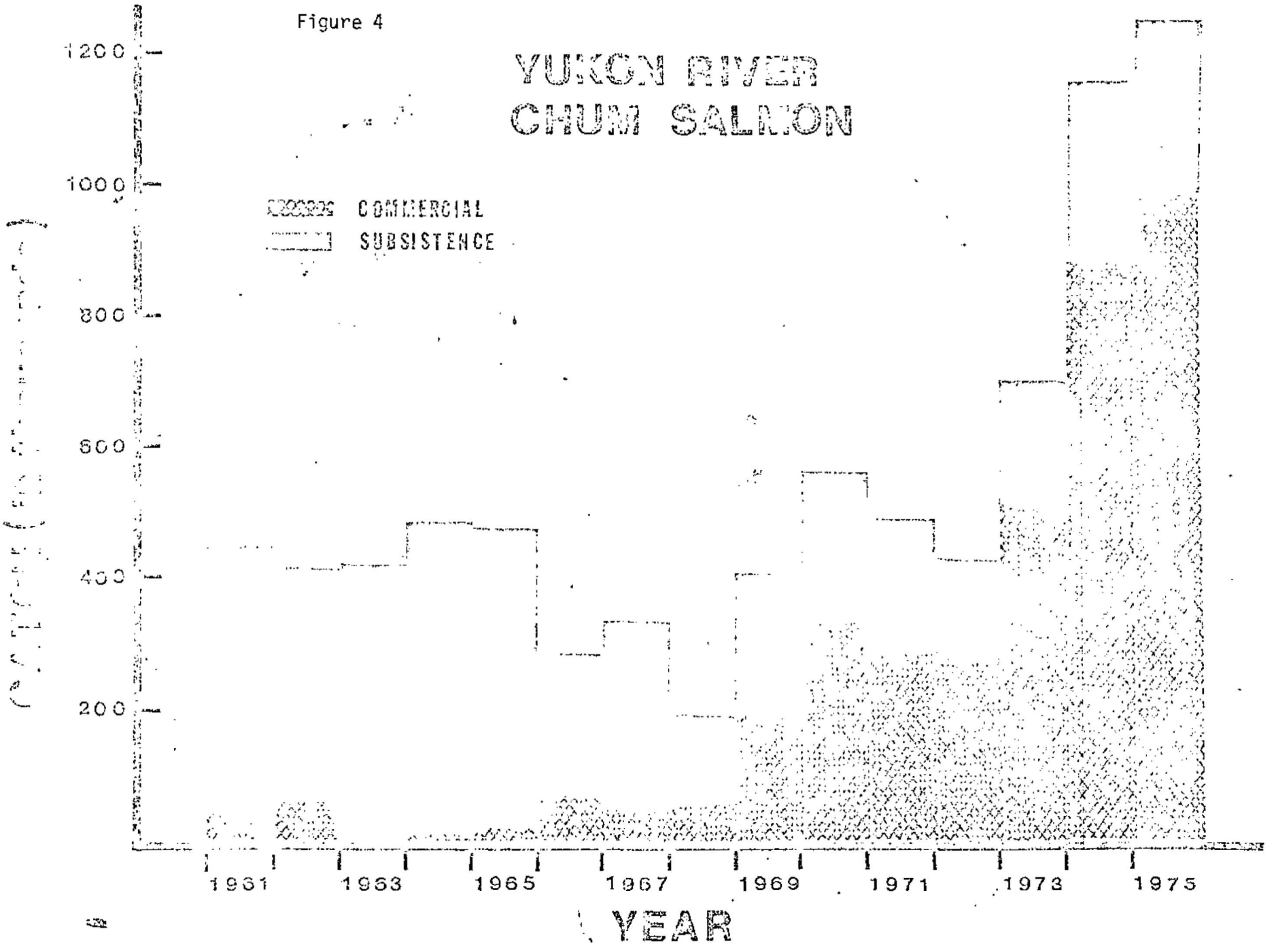
YUKON RIVER
CHUM SALMON
COMMERCIAL
SUBSISTENCE
1200
1000
800
600
400
200
1961
1963
1965
1967
1969
1971
1973
1975
YEAR

Figure 2

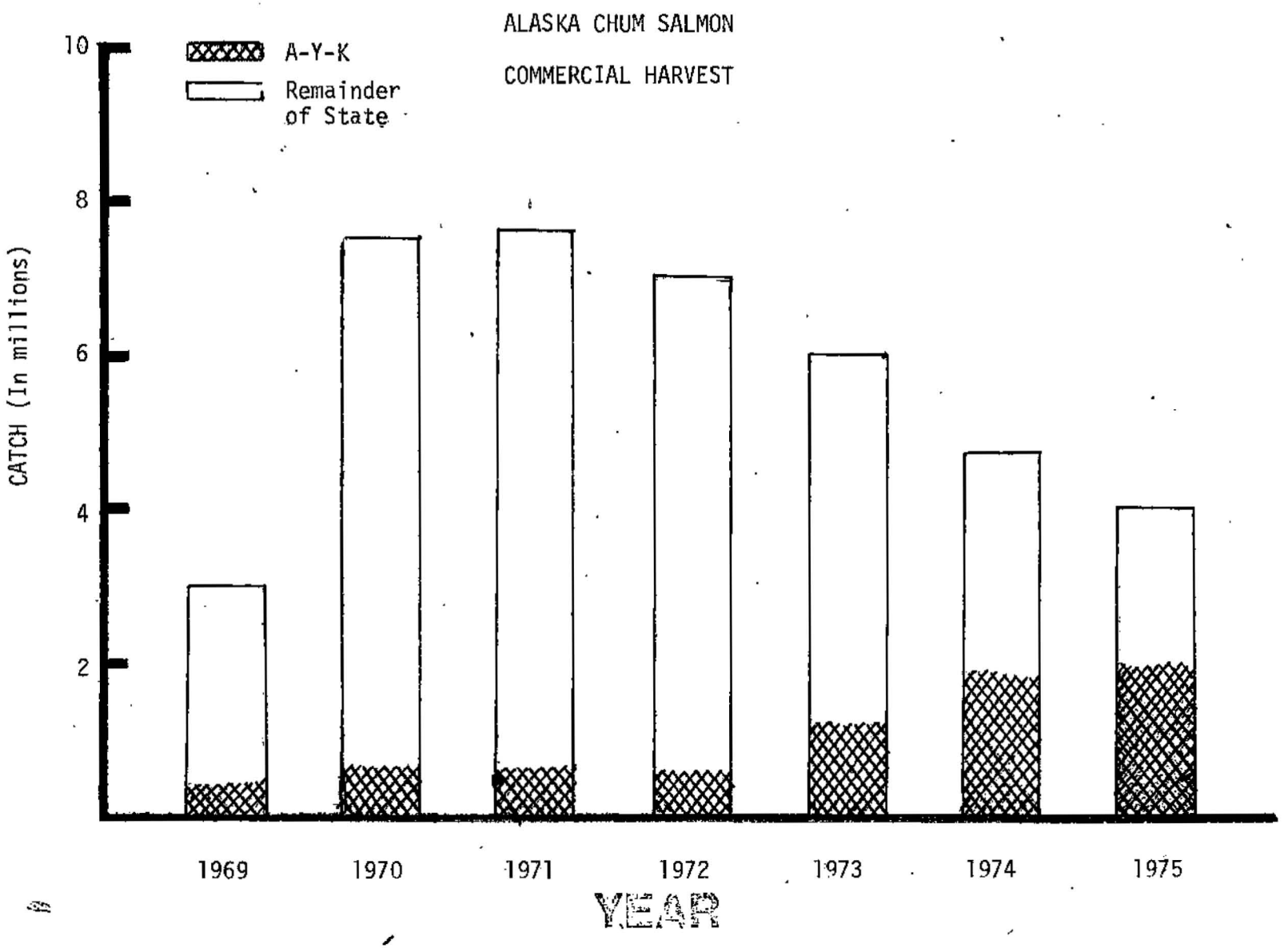
ALASKA CHUM SALMON
COMMERCIAL HARVEST
A-Y-K
Remainder of State
CATCH (In millions)
10
8
6
4
2
1969
1970
1971
1972
1973
1974
1975
YEAR

Figure 4

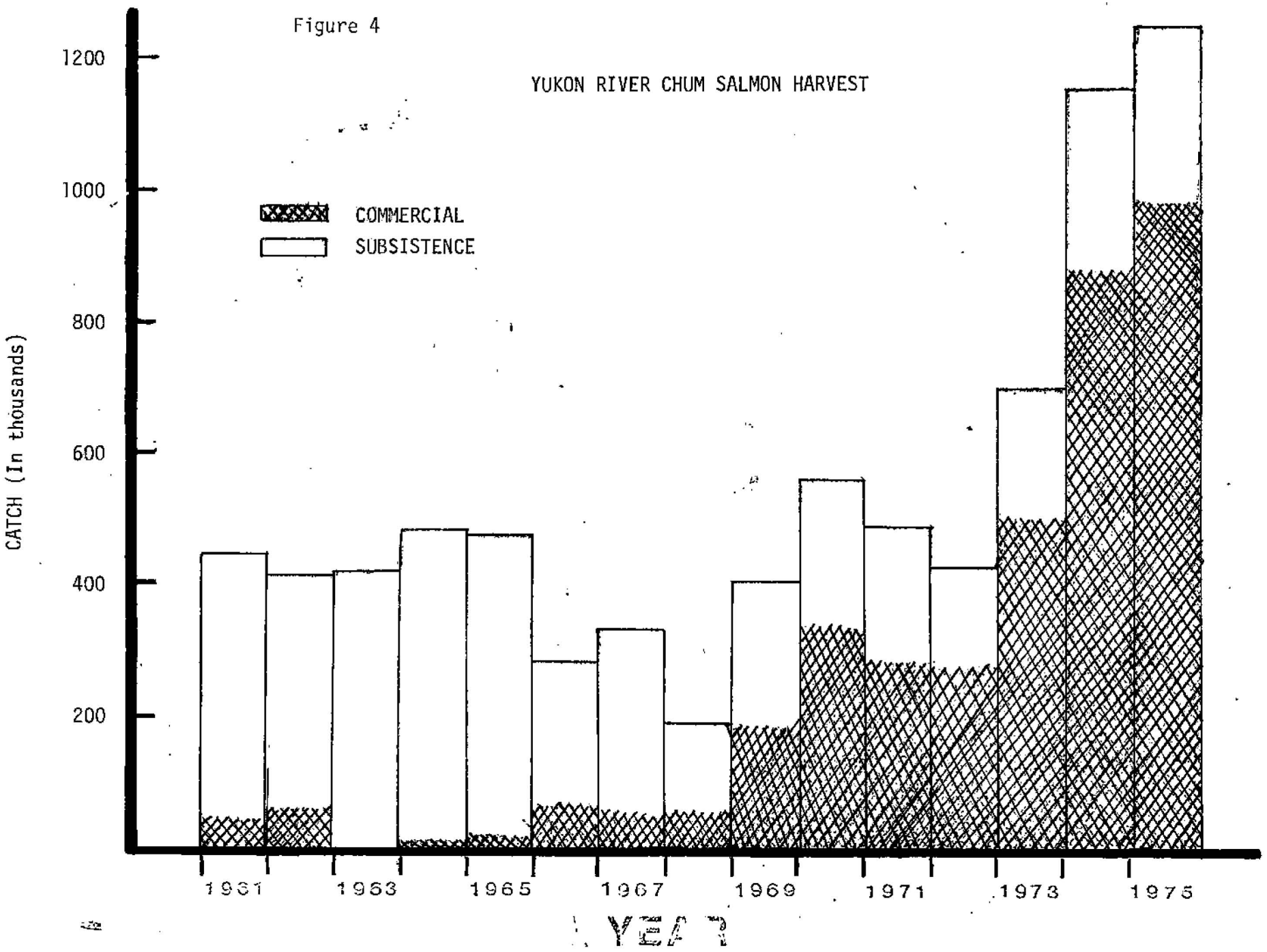
YUKON RIVER CHUM SALMON HARVEST
COMMERCIAL
SUBSISTENCE
CATCH (In thousands)
1200
1000
800
600
400
200
1961
1963
1965
1967
1969
1971
1973
1975
YEAR

Figure 4

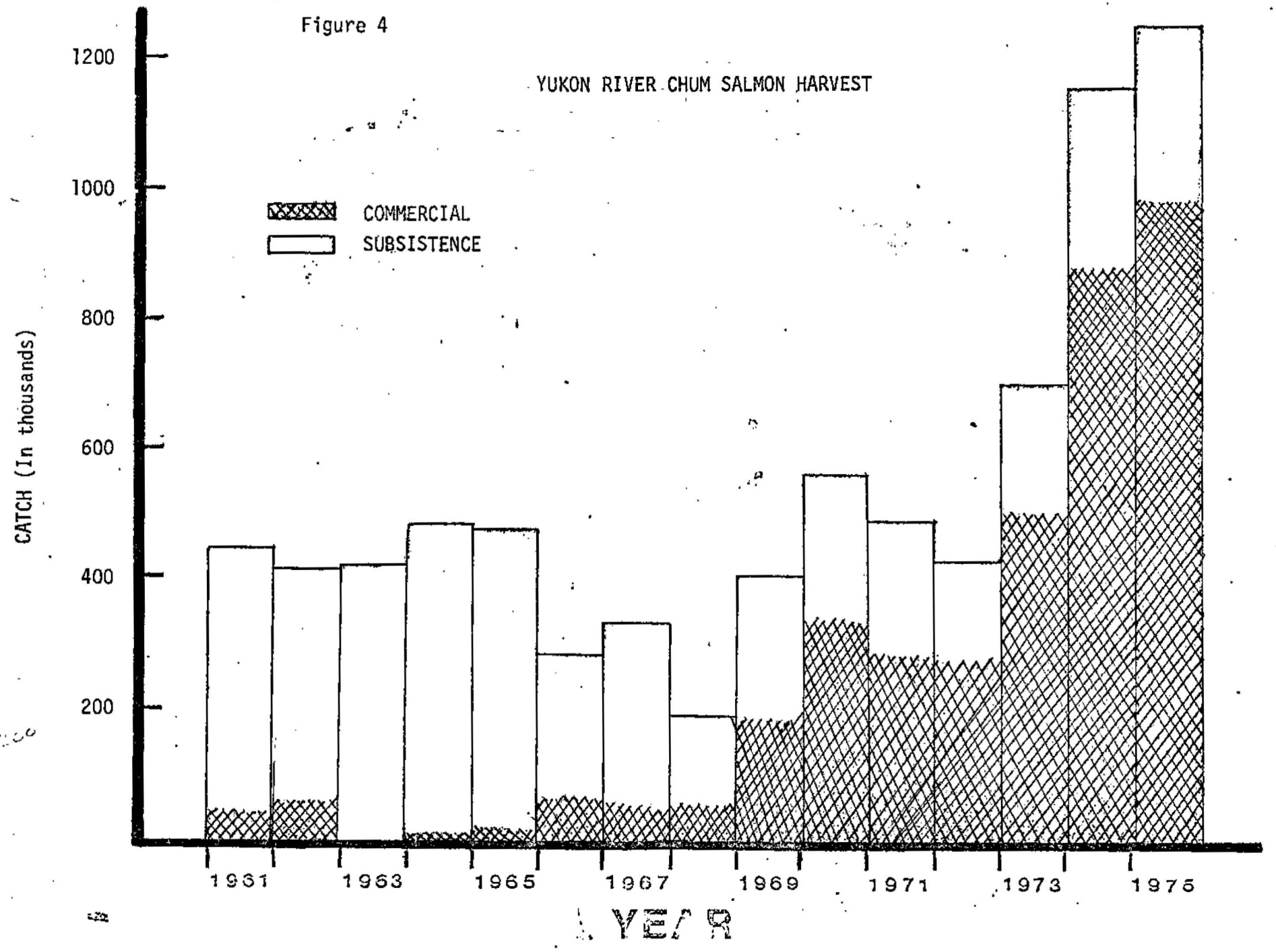
YUKON RIVER CHUM SALMON HARVEST
COMMERCIAL
SUBSISTENCE
CATCH (In thousands)
1200
1000
800
600
400
200
1961
1963
1965
1967
1969
1971
1973
1975
YEAR

Figure 3

KOTZEBUE COMMERCIAL CHUM

SALMON HARVEST